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Tortûm)—are cracked in the manner I should be inclined to expect from the action of an earthquake; and I would mention a remarkable rift known in the country by the name of the Dunya Buzurgu (Greatness of the World): this rift splits the mountain from top to bottom, and is about fifteen feet broad at the entrance. It took me from twenty minutes to half an hour to ride through it. The strata on the opposite sides correspond, and though a small stream flows through it, I should think, from its depth, the chasm can hardly have been formed by the action of water.

After careful inquiry on the spot, I was unable to ascertain that shocks have, within memory, been felt in the valley of Tortûm, or in the districts to the north-east; and I am inclined to believe that the slight shocks which I have above mentioned as of frequent occurrence, are (except as they may form part of a wider system) confined to the town and plain of Erzerûm; and, I am disposed to think, are scarcely felt in that part of the plain which lies to the north of the branch of the Euphrates, which divides it into two portions.

I have, however, ascertained that within the last two years shocks, but apparently slighter in character than those experienced in this neighbourhood, have been felt at many points in the area, which would be bounded by lines drawn between Erzerûm, Bitlis, Van, and Bayazid; but I am unable to collect sufficient information to connect the dates or directions of such shocks with the dates or directions of those experienced here.

In conclusion, I may state that many buildings of solid construction have—for instance, at Van and its neighbourhood (about 200 years ago), at Bayazid (about 60 or 70 years since)—been destroyed, or have severely suffered by earthquakes, although the shocks experienced of late appear, in this part of Turkey, to have been most severe in this immediate vicinity.*

X.—*Journey to Abyssinia in 1862.* By S. W. BAKER.

Read, November 24, 1862.

THE country between the Rivers Settite and Gellabat has never previously been explored. I have, however, worked through every portion in daily hunting for five months on the Settite, Salaam, and the Angarep, the other portion of the year having been passed in following the course of the Atbara into the Nile, and subse-

* Monsieur Abich, a distinguished Russian Geologist, has recently published an account of the earthquake at Erzerûm, of June, 1859, and the earthquake at Schamaki of the same period.

quently reaching the River Rahad, from Gellabat, and thence by that river and the Dinder and Blue Nile to Khartúm.

The country treated of in this communication lies between 12° and 16° N. lat., and 35° to 38° E. long. From 16° to the north all is desert. An approach from that point to the south produced a rapid change in the character of the country. Immense flats of rich soil commence about 50 miles north of Cassala, the capital of the Taka country, which, being uncultivated, appears as a desert in the dry season, but is luxuriant, in vegetation after the rains, forming the pasture-grounds of the Hadendowa Arabs.

The River "Gash" entirely loses itself in innumerable crevices and subterranean channels, having no outlet, nor any communication whatever with the Atbara River, as erroneously marked upon some charts. Although during the rains this torrent is between 500 and 600 yards wide, opposite Cassala it is not more than four or five deep, and the volume of water, although great, is insufficient to overcome the porosity of the soil, cracked into wide fissures of many feet deep by the sun acting upon a saturated loam. It divides into many hundred streams upon reaching the dead-level, and is entirely absorbed, supplying wells at 46 feet depth, plentifully throughout the dry season, in the desert between Goz and Cassala.

The porosity of the soil in this part of Africa is so great that none of the large rivers which flow from the Abyssinian range have sufficient strength to reach the Nile during the dry season; their springs being confined to the mountains, they become exhausted in their long course through a flat and thirsty soil. The river, which is a noble stream some 60 miles from the mountain-range, gradually decreases until it becomes a thread, and at length disappears in the broad sandy bed, which is full during the rains.

The great tributaries of the Atbara, the "Settite," "Salaam," and "Angarep," flow throughout the year, but the whole of their waters are absorbed by the sands of the Atbara during the dry season. The latter river-bed is between 400 and 500 yards wide at its junction with the Nile at Damer, but at many other points it much exceeds this width, with an average depth during the rains of about 35 or 40 feet. The Settite is actually the parent or main stream, as it flows throughout the year, and is far superior in length and breadth to the higher portion of the Atbara, beyond the junction of the "Salaam."

The Rahad and the Dinder in like manner lose their waters before joining the Blue Nile.

After leaving Cassala and striking due west, I again met the Atbara, and followed its course as far as Sherif el Ibrahim. The

whole country is the richest loam ; immense flat prairies of high grass interspersed with mimosas, but devoid of large trees. All these districts are eminently adapted for cotton.

These great prairies of flat land extend from the Atbara to the River Rahad and to the Blue Nile ; the whole might be cultivated with cotton, the patches now grown by the Arabs succeeding well.

The west bank of the Atbara is peopled successively by various Arab tribes—Bischareen, Jaleen, Shukericah, and Dabáina ; these are all under Egyptian rule.

We now cross over to the east bank at the Settite junction, opposite the village of Tomat. This is occupied by another tribe, the Hamran Arabs, who, although forced to pay tribute to the Egyptian Government, lean more towards the robber chief “Mek Nimmr.”

The hostilities of these tribes, and mutual fear, renders the magnificent country bordering the Settite and extending to Gellabat uninhabited.

Having left the rich but monotonous flats of prairie on the west of the Atbara, the eye is delighted with the grand chain of mountains, from 5000 to 8000 feet elevation, forming the s.s.e. boundary to a lovely park-like country of undulating ground, diversified by noble rivers of clear water, streams, rocks, woodland and prairie, all arranged as Nature alone can order it. Throughout this lovely country there is not the foot-print of a man, unless a party of honey-hunters venture upon a few days' hunt from the Tokrowris district.

The River Salaam rolls in a broad deep stream of some 200 yards, through overhanging woods and rocks and precipices ; and, man being absent, game is plentiful—including elephants, rhinoceros, giraffes, lions, buffaloes, and many varieties of antelopes ; while all the rivers abound with hippopotami.

Although the entire country is more or less interspersed with trees, none are of sufficient size to be called timber, except those which grow on the banks of streams.

The wood of the Baobab or Homr'r is useless. This tree is plentiful. The largest round tree I have measured was 51 feet 6 inches in circumference ; the bark is a valuable material for sacks and cordage.

Throughout the lands adjoining the Settite the most valuable kinds of Gum Arabic are in profusion ; gathered at present by the baboons, as there are no inhabitants.

The sudden bend of the Atbara to the south-east divides the districts of Guddabi and Gellabat. The latter is the “Ras el Feel” of Bruce.

Gellabat is the chief town of the Tokrowris, and is a considerable market; large quantities of honey, wax, cotton, hides, horses, and cattle being collected on the market-days bi-weekly.

The cotton is cultivated by the Tokrowris principally, although much is supplied by the Arabs.

The Tokrowris are settlers from Darfour, who, passing through the country during their pilgrimage to Mecca, have remained as emigrants. These men are more industrious than the Arabs, and, were they assured of protection, would shortly form large settlements and cultivate cotton throughout the beautiful country between the Settite and Atbara.

After the rains, the Egyptian troops will, I believe, make an expedition against Mek Nimmr; this nest of villains removed, there will be an opening in the country.

From Gellabat I went due west, reaching the River Rahad near the mountain "Hattowa." This river has not been examined further than about 70 or 80 miles from Rhanay; thus no European had ever been through the country I now reached. It was a vast flat of rich land, inhabited by wandering tribes of Arabs during the dry season, but deserted during the rains; no permanent habitations.

About 70 miles lower down, much cotton was grown, and tobacco, all of which is sent to Abyssinia.

A good stream was rolling forward at the first point I reached, but this was absorbed within 50 miles.

There are no rocks in the Rahad, but its deep bed has the appearance of a canal. The great objection to its navigation during the rains is its tortuous course.

After following its course for 140 miles, I crossed the river Dinder, then to the Blue Nile, and along its banks to Khartúm.

APPENDIX.

Route of S. W. BAKER, 1861-62.

Copper is in large quantities in the angle of the route between H.* Ma Serdi and H. Shahalla.

There are mountains in the range higher than the peaks enumerated, but I could not learn their names; the country being uninhabited, it was difficult to gather information. I imagine some of the mountains exceed 8000 feet.

The lower range of mountains are chiefly basalt, with some exceptions, which are granite; such as those at Cassala, and the three isolated hills marked in the Basé country.

The Settite flows through extraordinary masses of granite, forming water-

* H. signifies Hor, a stream or ravine.

falls and tremendous rapids for some miles on either side the junction of the Royān.

In most parts the Settite flows through deep beds of conglomerate of large pebbles, firmly cemented together by a calcareous deposit and sand. This is in many places upheaved and broken into large masses by protruding granite.

In that portion of the Settite, long. $36^{\circ} 10' \text{ E.}$, are cliffs about 100 feet high, of a peculiarly pure limestone, some snow-white, and others a bright rose-colour. This limestone again appears in the small range of mountains in Mek Nimmr's country, near the H. Shaballah. I have seen it in no other place.

I found lead ore by the Settite in white quartz, twelve miles west of the Royān.

XI.—*An Account of an Exploration of the Elephant Mountain, in Western Equatorial Africa.* By R. F. BURTON, Esq.,
F.R.G.S., Gold Medallist R.G.S., H.B.M. Consul Fernando Po, &c.

Read, April 27, 1863.

CAPTAIN LUCE, senior officer Bight division, having placed at my disposal H.M.S. *Bloodhound*, Lieutenant Commander Stokes, I resolved to visit Batonga. The weather when we set out was rough and stormy, nor did it improve during the 13 days between the 11th and the 23rd September. The Batonga country follows the rule of the Gaboon, having two dry and two rainy seasons; and the latter rains were commencing here, whilst ending in the northern parts of the coast. With a southerly wind and a rough sea, we steered a S.E. and by S. course, and at 6 P.M. anchored in Great Batonga Bay, a mere roadstead. The *Bloodhound* lay $1\frac{1}{2}$ mile off the land, in 5 fathoms water, lat. $2^{\circ} 52' \text{ N.}$, and long. $90^{\circ} 52' \text{ E.}$ At times a heavy surf breaks upon the whole of the lee-shore, from Camaroons River to Corisco Island; the landing is execrable, and many lives and canoes are lost. Lieutenant Dolben's gig was swamped, and we never went on or put off from shore without risk. There is, however, no difficulty in making Batonga Bay. At some distance, say 10 miles, it appears as a large headland, bounded north and south by the sea, and the small cascade of the Eloke, or Great Batonga River, offers a conspicuous land-mark. When nearer, four tall cotton-trees (*Bombax*), looking like gigantic palms, decorate the site of the sheds, representing the only European factories—those of Messrs. Laughland, and Messrs. Burford and Townsend. The aspect of the coast is by no means unpleasant. The country known to us by the names of Batonga or Banōkō—properly the names of important tribes—begins at the south shore of the innermost recess of the Bight of Biafra, and extends southward to Cape St. John: in this direction, the limit of the Consulate of Biafra. It is a long band of densely-wooded lowland, broken upon a yellow line of sand, broken in places, which appear